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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/682,516	09/13/2001	Matthew Sommers	GLO 2 0078	2609
27885	7590	11/30/2004	EXAMINER	
FAY, SHARPE, FAGAN, MINNICH & MCKEE, LLP 1100 SUPERIOR AVENUE, SEVENTH FLOOR CLEVELAND, OH 44114			SAWHNEY, HARGOBIND S	
			ART UNIT	PAPER NUMBER
			2875	

DATE MAILED: 11/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/682,516	Applicant(s) SOMMERS ET AL.	
	Examiner Hargobind S Sawhney	Art Unit 2875	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 September 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9, 12-14 and 16-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 12-14 and 16-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The amendment filed on April 5, 2004 has been entered. Accordingly:

- Claims 1, 13, 14 and 16 have been amended; and
- Claims 10, 11 and 15 have been cancelled.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3, 5, 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tung (US Patent No.: 5,842,297) in view of Tokunaga (US Patent No.: 5,375,043) and Tarne et al. (US Patent No.: 6,443,582 B1).

Regarding Claim 1, Tung ('297) discloses a lighting apparatus (Figure 2) comprising:

- a wave guide 40 (Figures 1-4, column) having a substantially planar light emitting face and a face bearing discrete micro structures 44,45 (Figure 3);
- the microstructures 44,45 (Figure 1 and 3, column 3, line 26) arranged on a surface – back surface- (Figure 3, column 3, lines 30-34);

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- the microstructures 44,45 interacting with light in a wave-guide 40, and scattering at least a portion of the light out of the wave-guide 40 in a pattern 42 (Figure 3, column 3, lines 18-22);
- the pattern 42 being determined by the arrangement of the microstructures 44,45 (Figure 3, column 3, lines 18-22); and
- a plurality of light emitting diodes (LEDs) 20 coupled to one edge of the wave-guide 40 (Figures 1,2 and 4, column 2, lines 50 and 51), and injecting light into the light guide 40 (Figures 1,2 and 4).

However, regarding Claim 1, Tung ('297) does not teach:

- a plurality of light producing element positioned around the perimeter of the wave guide;
- an encapsulant surrounding the plurality of LEDs;
- the plurality of LEDs including a first set of LEDs emitting light having a first color, and a set of LEDs emitting a second color mixing with the first color light in the wave guide to produce a third color light; and

On the other hand, Tokunaga ('043) discloses a lighting unit 1 (Figure 1)

comprising:

- a plurality of LEDs 2a-2d (Figure 1 and 2) disposed surrounding at the wave guide periphery (Figure 1, column 2, lines 46-52, and column 3, lines 8-11);
- the LEDs including a first set of LEDs 2a emitting light having a first color, and a set of LEDs 2b emitting a second color mixing with the first color

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- light in the wave guide 1 to produce a third color light (Figure 1,2, column 2, lines 46-52 and 61-64; and column 4, lines 25-30); and
- an encapsulant of a refractive index matching material – the portion of the light guide 1 defining and surrounding the cavities 1b for the LEDs 2a-2d (Tokunaga, Figure 2).

Thus, regarding Claim 1, it would be have been obvious to one of ordinary skill in the art at the time of the invention to modify the wave guide of Tung ('297) by providing the plurality of LEDs surrounding the wave guide, and the LEDs surrounded with the encapsulant as taught by Tokunaga ('043) for the benefits of efficient transmission of light and increased brightness for large displays.

In addition, further modify the lighting apparatus of Tung ('297) by providing the LEDs including a first and a second set of LEDs emitting lights of different colors as taught by Tokunaga ('043) for the benefit and advantage of displays with high attention value.

In addition, regarding Claim 1, Tung ('297) does not teach a curved face bearing discrete microstructures, instead Tung ('297) teaches structured surface being a planer surface;

On the other hand, Tarne et al. (582 B1) discloses a lighting apparatus (Figures 5 and 6, column 3, lines 61 and 62) comprising:

- a light emissive wave guide 66 including a curved textured bottom surface 65 (Figures 5 and 6, column 3, lines 61 and 62); and

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Thus, regarding Claim 1, it would be have been obvious to one of ordinary skill in the art at the time of the invention to further modify the lighting apparatus of Tung ('297) by modify the wave guide including discreetly arranged microstructures of Tung ('297) on the curved face as taught by Tarne et al. (582 B1) for the benefits of providing uniform brightness over a large areas of display.

Regarding claims 2,3,7 and 9, Tung ('297) in view of Tokunaga ('043) and Tarne et al. (582 B1) discloses the lighting apparatus further including:

- the pattern 42 further including a letter D (Tung, Figure 3, column 3, lines 18-22);
- the microstructures 44,45 scattering in wide angles (Tung, Figures 3 and 4, column 3, lines 35-44);
- the plurality of light emitting diodes (LEDs) 20 injecting light into the planer region of the light guide 40 (Tung, Figure 4); and
- a refractive index-matching material- being material of the same casting it operationally meets the operational needs- (Tokunaga, Figure 1).

Regarding Claim 5, Tung ('297) in view of Tokunaga ('043) and Tarne et al. (582 B1) teaches a wave-guide 1 (Tokunaga, Figure 1, column 2, line 21) being either a colorless or colored transparent plate (Tokunaga, Figure 1, column 1, lines 55 and 56; and column 3, lines 33-36).

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tung (US Patent No.: 5,842,297) in view of Tokunaga (US Patent No.: 5,375,043) and Tarne et al.

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(US Patent No.: 6,443,582 B1) as applied to claim 1 above, and further in view of Lea et al. (US Patent Application Pub. No.: US 20010038539 A1) hereafter referred as Lea.

Tung ('297) in view of Tokunaga ('043) and Tarne et al. (582 B1) discloses a lighting apparatus comprising a light guide including microstructures disposed on its one of the surfaces. However, neither combined nor individual teaching of Tung ('297) and Tokunaga ('043) and Tarne et al. (582 B1) teaches the surface with microstructures additionally having cladding.

On the other hand, Lea discloses an illuminating device (Figure 1) comprising a light guide 30 (Figure 1, Para. 0024) including cladding comprising a surface coating 36 with cladding material (Figure 1, Para. 0024).

It would be have been obvious to one of ordinary skill in the art at the time of the invention to modify the wave guide of Tung ('297) in view of Tokunaga ('043) by providing the cladding as taught by Lea for the benefit and advantage of providing high light reflection efficiency.

5. Claims 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tung (US Patent No.: 5,842,297) in view of Tokunaga (US Patent No.: 5,375,043) and Tarne et al. (US Patent No.: 6,443,582 B1) as applied to claim 1 above, and further in view of Yamana et al. (US Patent No.: 5,418,384).

Regarding Claim 6, dependent on Claim 1; and Claim 8, dependent on Claim 7, of Tung ('297) in view of Tokunaga ('043) and Tarne et al. (582 B1) teaches a flat- with no tapered or curved surface - wave-guide. However, neither combined nor individual teaching of Tung ('297) and Tokunaga ('043) and Tarne et al. (582 B1) teaches a wave-

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guide including a surface having a pre-selected curvature, and the curved surface further bearing microstructure.

Additionally, regarding Claim 8, neither combined nor individual teaching of Tung ('297) and Tokunaga ('043) and Tarne et al. (582 B1) teaches a wave-guide being tilted with respect to the planar region.

On the other hand, Yamana et al. ('384) discloses a light source device (Figures 7, 9 and 11) comprising a wave-guide 11 (Figure 7, column 4, lines 64 and 65) including a surface 12 having a pre-selected curvature (Figures 9 and 11). Further, a portion f7-f9 of the surface 12 bearing microstructures being tilted (Figures 9 and 11, column 6, lines 46-50).

Thus regarding Claims 6 and 8, it would be have been obvious to one of ordinary skill in the art at the time of the invention to further modify the wave guide of Tung ('297) in view of Tokunaga ('043) and Tarne et al. (582 B1) by providing a the wave guide with pre-selected curvature as taught by Yamana et al. ('384) for the benefit and advantage of providing a wave guide imparting uniformly distributed light output throughout the light emitting surface area.

6. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gwo-Juh et al. (US Patent No.: 6,164,791) in view of Kuwabara et al. (US Patent No.: 6,508,564 B1).

Regarding Claim 12, Gwo-Juh et al. ('791) discloses an optical wave guide 2 (Figures 3-12) comprising:

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- a transparent material – light guide - 2 formed into a shape including a top surface and an arcuate bottom surface (Figures 8 and 12) and at least one side surface optically communicating with a light source 5 (Figures 3,5,8 and 12, column 2, lines 56-58; and column 3, line 18);
- a plurality of microstructures 21 (Figures 3,5,8 and 12, column 2, lines 60 and 61) disposed on the bottom surface;
- the microstructures scattering at least a portion of light injected from the light source 5 (Figures 3,5,8 and 12, column 2, lines 56-61);
- the scattered light forming a pre-selected (Figure 13, column 1, lines 44-49) light output pattern viewable from outside the waveguide 2.

However, Gwo-Juh et al. ('791) teaches the light guide being shaped from a transparent material instead of the light guide being shaped from a translucent material as claimed by the applicant.

It would be have been obvious to one of ordinary skill in the art at the time of the invention to modify the wave guide of Gwo-Juh et al. ('791) by providing translucent light guide well known in the art as evidenced in Kuwabara et al. (US Patent No.: 6,508,564 B1, column 5, lines 31-33) for the benefits of providing light guides capable of both reflecting and refracting the incident light from the light source.

Regarding Claim 13, Gwo-Juh et al. ('791) in view of Kuwabara et al. ('564 B1) further discloses the microstructure including texture formed on the bottom surface (Gwo-Juh, Figure 5 and 13, column 1, lines 43-48 and column 3, lines 28-30).

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7. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gwo-Juh et al. (US Patent No.: 6,164,791) in view of Lea et al. (US Patent Application Pub. No.: US 20010038539 A1).

Gwo-Juh et al. ('791) discloses an optical wave-guide including microstructures disposed on its bottom surface. However, Gwo-Juh et al. ('791) does not teach the surface with microstructures additionally having cladding.

On the other hand, Lea discloses an illuminating device (Figure 1) comprising a light guide 30 (Figure 1, Para. 0024) including cladding comprising a surface coating 36 with cladding material (Figure 1, Para. 0024).

It would be have been obvious to one of ordinary skill in the art at the time of the invention to modify the wave guide of Gwo-Juh et al. ('791) by providing the cladding as taught by Lea for the benefit and advantage of providing light reflection efficiency to its highest level.

8. Claims 16,18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tarne et al. (US Patent No.: 6,443,582 B1) in view of Lea et al. (US Patent Application Pub. No.: US 20010038539 A1).

Regarding Claim 16, Tarne et al. (582 B1) discloses a lighting apparatus (Figures 5 and 6, column 3, lines 61 and 62) comprising:

- a light emissive wave guide 66 including a curved textured bottom surface 65 (Figures 5 and 6, column 3, lines 61 and 62);
- the light wave guide 66 further having its perimeter thicker than its center portion (Figures 5 and 6);

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- a plurality of light producing element 16 positioned around the perimeter of light emissive elements 16 (Figure 6, column 4, lines 16 and 17);
- the light producing element 16 emitting light substantially along the axis orthogonal to the light emissive wave guide 66 (Figures 5 and 6);

However, Tarne et al. (582 B1) does not teach an optical cladding opposed to the curved textured bottom surface.

On the other hand, Lea discloses an illuminating device (Figure 1) comprising a light guide 30 (Figure 1, Para. 0024) including cladding comprising a surface coating 36 with cladding material (Figure 1, Para. 0024).

It would be have been obvious to one of ordinary skill in the art at the time of the invention to modify the wave guide of Tarne et al. (582 B1) by providing the cladding as taught by Lea for the benefit and advantage of providing light reflection efficiency to its highest level.

Regarding claims 18 and 19, Tarne et al. (582 B1) in view of Lea discloses the lighting apparatus additionally comprising;

- the textured surface 65 forming a symbol – a plurality of concentric “Os” – (Tarne, Figures 5 and 6); and
- the textured surface including a plurality of microstructures 43 and 46 arranged in a pattern on an interior side of the light emissive waveguide (Tarne, Figure 7).

9. Claim 17 is rejected under 35 U.S.C. 103(a) as being) unpatentable Tokunaga (US Patent No.: 5,375,043).

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Tokunaga ('043) discloses a lighting apparatus (Figures 1 and 2, column 2, lines 20 and 21) comprising:

- a light emissive wave guide 1 including a textured bottom surface 1a (Figures 1 and 2, column 2, lines 21-30);
- a plurality of light producing elements 2a-2d arranged about the perimeter of the light emissive wave guide 1 (Figure 1, column 2, lines 46-52, and column 3, lines 8-11);
- the light, produced by elements 2a- 2d, interacting with the textured surface 1a, and being emitted by the light wave guide 1 (Figures 1 and 2);
- an encapsulant – waveguide's end extensions 1 defining and surrounding the cavities 1b for the LEDs 2a-2d (Tokunaga, Figures 1 and 2, column 2, lines 41-45), and abutting – being molded in one piece from one material- the wave guide; and
- the encapsulant matching – being integral and part of the same material- a refractive index of the light wave guide 1 (Figures 1 and 2).

Although, Tokunaga ('043) does not specifically teach a separate encapsulant surrounding the plurality of LEDs and abutting the light-emissive wave guide, Tokunaga ('043) discloses a wave guide having each of its end extensions including a plurality of cavities each receiving an LED. Thus, the end extension functionally equivalent to claimed separate encapsulants.

It would be have been obvious to one of ordinary skill in the art at the time of the invention to have one-piece wave guide including an encapsulant integral at its each

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end for an LED as taught Tokunaga ('043) for the benefit and advantage of providing a cost effective combination of a wave guide and encapsulant requiring minimum number of parts.

Response to Amendment

10. Applicant's arguments filed on September 13, 2004 with respect to the 35 U.S.C. 103(a) rejections of claims 1- 9 have been fully considered but they are not persuasive.

Argument: Regarding claim 1, neither combined or individual teaching of Tung ('297) and Tokunaga ('043) discloses micro structural elements within the wave guide on a curved surface.

Response: As indicated in section 3 of this office action, Tung ('297) in view of Tokunaga ('043) and Tarne et al. (582 B1) discloses the lighting apparatus including a light emissive wave guide 66 including a curved textured bottom surface 65 (Tarne, Figures 5 and 6, column 3, lines 61 and 62).

Argument: Regarding claim 12, Gwo-Juh does not teach selectively arranged microstructures producing pre-selected directional light output patterned.

Response: Gwo-Juh discloses an optical wave guide 2 (Figures 3-12) comprising:

- a plurality of microstructures 21 (Figures 3,5,8 and 12, column 2, lines 60 and 61) disposed on the bottom surface;

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- the microstructures scattering at least a portion of light injected from the light source 5 (Figures 3,5,8 and 12, column 2, lines 56-61);
- the scattered light forming a pre-selected (Figure 13, column 1, lines 44-49) light output pattern viewable from outside the waveguide 2.

"pre-selected light output pattern" recited in Claim 12 of the instant application does not include any specifics associated either structure or function of the lighting apparatus. Thus, the above-indicated limitation is fully met by the teaching of Gwo-Juh.

Argument: Regarding claim 16, Tarne et al. (582 B1) does not teach a curved structured bottom surface having optical cladding opposed thereto.

Response: As indicated in section 8 of this office action, Tarne et al. (582 B1) in view of Lea discloses a lighting apparatus (Figure 1) comprising a light guide 30 (Figure 1, Para. 0024) including cladding 36 on the curved bottom surface of the wave guide (Lea, Figure 1, Para. 0024).

Argument: Regarding claim 17, Tokunaga ('043) does not teach an LED encapsulant as an element separate from the wave guide.

Response: Although, Tokunaga ('043) does not specifically teach a separate encapsulant surrounding the plurality of LEDs and

abutting the light-emissive wave guide, Tokunaga ('043) discloses a wave guide having each of its end extensions including a plurality of cavities each receiving an LED. Thus, the end extension functionally equivalent to claimed separate encapsulants.

It would be have been obvious to one of ordinary skill in the art at the time of the invention to have one-piece wave guide including an encapsulant integral at its each end for an LED as taught Tokunaga ('043) for the benefit and advantage of providing a cost effective combination of a wave guide and encapsulant requiring minimum number of parts.

Additionally, It would be have been obvious to one of ordinary skill in the art at the time of the invention to make the encapsulant a separate element, since it has been held that forming an article in two piece which has formerly been formed in one piece. This type of modification is a merely a matter obvious engineering choice, and involves only routine skill in the art.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

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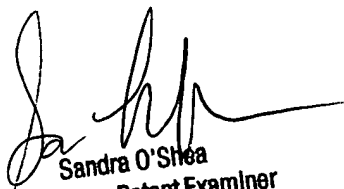
TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hargobind S Sawhney whose telephone number is 571 272 2380. The examiner can normally be reached on 6:15 - 2:45.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on 571 272 2378. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HSS
11/23/2004


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